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# THE PROBLEM OF ATTENTION.[1]

## I.

I AM looking at the flowered pattern of the paper on the wall in front of me. I see the intertwining of the stems, and the outline of flowers and leaves; I am conscious of the differences in color and brightness within the pattern itself and between it and the uniform background. All these details come out with perfect clearness at the spot upon which my gaze is directed. It is true that this spot is of no great size; its diameter, as I sit at a distance of one meter from the wall, is only some six centimeters. Around this spot I notice that the flowered pattern loses in clearness, at first slowly, then more and more quickly, until I reach the limit of my field of vision, and cannot make out any pattern whatsoever. If I did not know that the whole wall is covered with the same paper, I should suppose that the paper-hanger had chosen less and less pronounced patterns, the farther he moved from the point upon which my eyes are fixed, until finally all pattern and color were lost in an indifferent gray.—In this description I have, of course, assumed that the eyes do not move.

I am short-sighted, so that I cannot see the pattern clearly unless I wear glasses. If I take them off, the part of the pattern directly before me looks like the part of the wall that I saw just now round about the point of regard. The contours are indistinct and the details are blurred. The books, placed a little further below, have their titles printed on the covers in large black letters. I am now unable to read them, and my eye must approach considerably nearer to recognise the words without glasses. The two differences of distinctness, hitherto mentioned, are known to depend on the peripheral organisation, i. e., on the mechanism of the sense-organ, the eye. The retina, on which the objects of the external world must project their images in order to be perceived, has at its centre a depression known as the point of clearest vision. The light-perceiving elements are here set most closely together, and thus make possible the most exact representation of the outer-world. Beyond this depression there are interstices between the elements; they increase with the distance from it, and we lose accordingly first the finer and then the coarser differences in the form of the retinal images; till at last all details disappear in a confused general impression. And again, the rays of light proceeding from a luminous point in the outside world cannot be reunited at a single point on the retina, unless the lens of the eye have the appropriate focal distance, which can be varied within certain limits by what is called the mechanism of accommodation. Beyond these limits, which for the short-sighted eye are extremely narrow, the images of luminous points in external space are not themselves points but circles, "dispersion circles" of greater or less diameter. Consequently, objects which lie at a distance for which accommodation is impossible are seen hazily and indistinctly.

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[1] Translated by Professor E. B. Titchener, Cornell University.

But there may be still other reasons for the indistinctness of the pattern of my wall paper. If, e. g., I am blowing a cloud of smoke from my cigar, and the smoke floats up between my eye and the wall, I see the pattern dimly as if through a veil. So, on a foggy day, I may adjust my eyes as accurately as may be; but I shall not make out a single detail of the mountains among which I stand. I can hardly distinguish the line of division between them and the horizon. The production of this sort of indistinctness, which evidently depends upon objective conditions, is a problem in physics. It lies altogether beyond my power or volition. The production of the other two forms of indistinctness, on the contrary, is a problem in physiology. The differences in visual perception are conditioned upon certain peculiarities of the sense organ,—upon a change in the structure of the retina, and upon the range of accommodation. But, here as before, our mind is not directly responsible for them. Their conditions are to be sought, not in any attitude of mind, but in the eye. So that distinctness or indistinctness of vision, as we have spoken of the matter hitherto, is not brought about by any mental state or mental process, and is innocent of any psychological significance.

We may, however, take a fourth instance of difference in clearness of vision, which will lead us to a very different conclusion. I take my seat once more, and direct my gaze upon the pattern before me; but as I look, my mind is busily engaged upon a scientific problem. I am reviewing in thought the controversy that has recently arisen regarding the aims of historical research,—balancing the pros and cons, wholly engrossed in the one train of thought. When I try subsequently to call up the impression that the pattern made upon me, as I sat thinking, I have to confess that at best I had only a fleeting glimpse of it, now distinct and now indistinct, and that there were times when I did not see it at all. Yet my eyes were kept constantly open,—apart from momentary interruptions by winking reflexes,—and were directed steadily upon one and the same spot. It is clear that, in this case, there can be no question of differences in objective clearness. Neither can this new observation be adequately explained by appeal to the peripheral or physiological factors. It may, of course, have happened that my eyes slipped a little, without my knowledge, from the exact point of fixation, or that there were slight changes from time to time in the state of accommodation; but it is obvious that occurrences of this sort cannot bear the full burden of explanation. On the contrary, I am very sure that my mental state at the time of observation, my intensive occupation with a definite train of thought, rendered it difficult or impossible for the visible object to gain access to consciousness.

Other instances may be adduced in proof of this influence of state of mind upon sense-perception. I do not hear the noises in the street, when I am entirely absorbed in work, although the objective and peripheral conditions for their perception are fully realised. My student lamp has been smoking for some time; but I did not notice the fact until the smell had become so strong as literally to force itself upon consciousness. Now I have suddenly become aware of it, in a very unpleasant way. Again, my secretary is reading aloud to me. As I listen, I begin to think of something that I mean to do in the near future. When I have worked out my plan of action, I come back to the reading, and am made aware that I have lost some part of it; I cannot bring my knowledge of the subject-matter into relation with the words that I now hear. While I was occupied with my plan, the tones of the reader's voice, which I seem to have followed without interruption, were empty, meaningless sounds. Once more, we are listening to single notes played upon some musical instrument, piano or violin. The science of acoustics declares that these single notes are not simple tones, but consist of a fundamental tone and of certain overtones, whose character depends upon the nature of the instrument. If we have had practice in the analysis of these notes, we are able to 'hear out' the separate overtones, besides hearing the fundamental. But, again, it depends upon a peculiar mental attitude, or state of mind, whether we hear or do not hear the overtones. We may address ourselves to the note as an undivided whole, in which case its partial tones escape our notice.

These facts, and others like them, furnish the basis of the notion of *attention*. We say that it depends upon the attention whether sense-impressions—visual, auditory or what not—come to consciousness, or whether the details of a picture or the constituents of a note are made out or discriminated. And in saying this, we think of the attention as a state of mind which may be realised in greater or less degree, and may embrace at any given time a larger or smaller number of conscious processes. Having regard to the varying depth or intensity of attention, we ascribe to it the attribute of *concentration;* this we take to be greater, the more difficult it is to divert the attention from its present object. Having regard to the multiplicity of contents upon which it can fasten, we speak of various *directions* of the attention; thus 'local' attention is an attention directed upon a particular point in space. Further, in view of the variable number of objects with which the attention may be occupied, we speak of its *distribution* as well as of its concentration. The distribution of the energy of attention, i. e., of its degrees of concentration, may itself be either uniform or variable. Lastly, we contrast attention with *inattention*, which signifies either a total lack of concentration or distribution, or at any rate a lack in some given direction; and we recognise in distraction a special form of inattention, a 'scatter-brained' state which manifests itself characteristically in inappropriate remarks and unsuitable actions.

Popular psychology, which perhaps found its most faithful expression in the experience-psychology of the eighteenth century, confuses in its idea of attention three very different notions: that of a *faculty*, the operation of which produces certain changes in the mental life; that of an *activity*,—the activity of remarking, noticing, observing,—always directed upon some definite content which is the immediate occasion of its exercise; and, lastly, that of a *state*, in which we continue for a longer or a shorter time, unaffected by changes in the contents of our consciousness. State and activity are alike conceived of as the effects or manifestations of attention in its first meaning, as mental faculty. That the same name should be used to designate both cause and effect is nothing unusual in 'common sense' psychology. The term 'will,' for instance, signifies on the one hand a faculty, a capacity for a considerable number of actions that are in certain respects alike, while on the other it denotes the individual act proceeding from this faculty. Nothing more could be said of the 'faculty' than that it is a cause, residing in the subject himself, of the occurrence of certain mental phenomena; and with such a definition there is nothing strange in the use of the same word for both cause and effect. We find precisely the same thing in physics. The word 'gravitation,' for example, is used on occasion for the unknown cause of all those processes or properties that together constitute the facts of gravitation.

It is the aim of modern science, physical and psychological, to supply a concrete filling for such indeterminate concepts, to characterise more definitely the nature of the cause in question, and wholly to eliminate the colorless, abstract, empty and misleading notion of force or faculty. But to obtain a knowledge of causes or, in more modest terms, to pave the way for this knowledge, we must have recourse to an exact study of the facts themselves. Modern psychology has been able to gain a deeper insight into the phenomena of attention, by subjecting them directly, in their qualitative and quantitative aspects, to careful investigation. In what follows we shall attempt, in the light of the results thus obtained, to develope a comprehensive view of the nature and functions of attention. The distinctness or indistinctness that results from attention or lack of attention we shall designate, in contradistinction to the objective and peripheral forms, as *psychophysical* or *central*. As we are here concerned with facts that are not dependent upon any particular group of conscious contents (e. g., the sensations of a single sense-department, or the ideas of perception), we may speak in quite general terms of distinct or indistinct 'consciousness' and of its degrees.

## II.

The first and most important problem that arises, in a discussion of the attention or of the degrees of consciousness, is, of course, that of an exact determination of the nature of the attentive state. Wherein does this psychophysical distinctness or indistinctness consist? How are we to distinguish it from the objective and peripheral forms? Modern inquiry has proved, in the first place, that there is, as a rule, a close intrinsic connection between attention and the processes and mechanisms that subserve what we have called peripheral distinctness. If I turn my attention to some object in the room, my gaze is at once and involuntarily directed towards this object, with the appropriate degree of accommodation. But if, as I contemplate the object, my attention shifts to some topic of thought; if, as the technical phrasing runs, it changes from a 'sensory' to an 'intellectual' attention; then the muscles of accommodation involuntarily relax, and the lines of regard tend to take a parallel direction; it is as if I were looking into an infinite distance, where there are no objects to be observed. True, this connection between sensory attention and the adjustment of the sense-organ concerned—an adjustment that secures the peripheral distinctness of the observed impression—may, within certain limits, be weakened or even abolished, though not without especial pains and practice. We are able, with a certain effort, to bring the objects seen in indirect vision to the forefront of attentive observation. One sometimes meets people in society who possess this power in a marked degree. While their eyes seem to be gazing steadily at what is in front of them, they are secretly alert to what is happening on either side. But this sort of incongruity between central and peripheral distinctness is, of course, impossible save in cases where the physiological mechanism is directly controlled by the will. Movements of the eyes are voluntary; change of accommodation is not. Hence we cannot break down the natural connection between accommodation and attention unless we direct our gaze upon an object which is not the object of attention, or attend to an object that lies outside the range of accommodation.

Vision is not the only sense-department in which these peripheral changes of distinctness occur. If, for instance, we are seeking to identify an odorous gas, we make a number of short, sharp inspirations: we 'sniff' at the flask. And again, to bring out a taste distinctly, we make certain movements with the tongue, whereby the stimulus that we are examining is crushed and diffused. It is, indeed, a general rule that peripheral distinctness and central distinctness go hand in hand; and it is not easy, without special investigation, to say how much of the total effect is due to the one factor and how much to the other. We run a very real danger of ascribing to attention, i. e., to a determinate mental state or attitude, results that are actually conditioned upon the special adjustment of the sense-organ concerned.

There is a further difficulty. If we are to have any exact knowledge of the degrees of consciousness, we must be able to vary them at will. In other words, we must be in a position to induce, at our pleasure, this or that grade of psychophysical distinctness, as independently as may be of all extrinsic influences. Experience shows that there are but two ways, in the normal waking state, by which this end may be accomplished. We may either distract the attention, or we may divide it. Now distraction of the attention, in the strict sense of the term, means the inducing of inattention, i. e., of the lowest degree of consciousness; so that, if we are to obtain any other grade of psychophysical distinctness, we must have recourse to a division or distribution of attention. But again, when we have reduced a given degree of concentration to a lower level, by this division of attention, we still have no standard by which we might measure the change of consciousness. For, as was said just now, the distribution of the activity of attention may be anything but uniform. As I listen to an opera, my attention is held, first and foremost, by the scenes that are enacted upon the stage and by the voices of the performers, while the music of the orchestra recedes into the background. But this attitude of mind need not persist; in scenes where the plot moves but slowly, it may be entirely reversed. In this, then, as in many other instances, there can be no question of a really uniform distribution of the energy of attention.

Furthermore, the power of a stimulus or an occupation to distract the attention does not remain constant. If it is often repeated, we grow accustomed to it, and have little difficulty in meeting the demands which it lays upon us. It thus gradually loses its original power of dividing or diverting the attention. It is clear that, if we are to induce a determinate degree of consciousness, we must know, first, the mode of distribution of the total energy of attention over the separate conscious contents included within its range, and, secondly, the distractive value of the process which we have selected for our purpose. Now no general rule can be laid down under either heading; the results that have been obtained hold only in particular cases; so that, from this point of view also, the investigation of attention is peculiarly difficult. So much we may say, and no more: that the distribution of attention brings with it a reduction, and concentration of attention an enhancement, of the degree of consciousness for a determinate content. Psychologists have not yet attained to any quantitative formulation of these changes.

There is still a final obstacle to the systematic treatment of the phenomena of attention. When we attempt to study the changes in conscious contents that follow upon a partial withdrawal of the attention, we find that the very conditions of our inquiry are hostile to any adequate account of the altered experience. It is essential, if we are to describe what we perceive, that we hold (or are able to hold) our attention upon the objects presented. The more effective the distraction, the more imperfect is our portrayal of consciousness. Suppose, for instance, that we are asked to reproduce the contents of a page, which we have read while our thought was wandering from the subject of the book; there will be many gaps and errors in our recollection. And what holds of reading holds in like manner of quite simple tests. Suppose that we are comparing two sounds of given intensities, made by the fall of an ivory ball upon a block of hard wood,—the one heard under conditions of complete attention, the other while we are engaged upon some arithmetical problem: our judgment as to the relative intensity of the sounds is extremely uncertain. But we have no other appeal; our only means of instituting a systematic comparison, of obtaining anything better than the chance results of occasional observations, is to make our experiments and accept the report that follows. It is clear that the whole outcome is equivocal. We cannot tell how much should be ascribed to the changes in consciousness, and how much to mere inadequacy of description.

## III.

All these possibilities and difficulties must be borne in mind by any one who seeks to interpret and explain the facts of the psychology of attention. The first of these facts to notice is that the *comparison and discrimination of sense-impressions* are seriously affected by division or diversion of the attention, in whatever way produced; whether the observer be called upon to work arithmetical problems, to follow a narrative as it is read aloud to him, to name or identify other sense-impressions, or what not. Not only do the judgments of comparison show large variations, indicate a wide margin of uncertainty; but the just noticeable difference, the 'differential limen,' as it is technically called, also reaches an unusually high value. The sensible discrimination, that is, the capacity to distinguish and to compare, is, again in technical expression, both 'coarser' and 'less' than is normally the case. For example, with complete concentration we are able in 70 per cent. of all tests to recognise the difference between two weights of 50 and 55 gr. laid successively upon a given area of the skin. But if the attention be distributed, by one of the above mentioned methods, we perceive the difference only in 40 per cent. of our tests.

How are we to explain this result? What are the processes that co-operate to bring it about? That the subjective difference between the weights is so much reduced by reduction of the attention can hardly be ascribed to any peripheral, physiological cause. For the stimulation is the same in both cases. We do not know that the skin possesses any mechanism of accommodation to pressure; but the only effect of such a mechanism, if it exists, would be that the weights themselves, as they were applied, should appear heavier or lighter. And this absolute shift of subjective intensity would, of course, neither increase nor diminish the difference between the two. Let us suppose, for example, that the distribution of attention co-operates with some such mechanism of accommodation to reduce by 10 gr. the value of each of the weights for sensation. We should then have to do with weights of 40 and 45 gr. The original, objective difference stands to the smaller of the weights in the ratio 1:10; this ratio has now increased to 1:8. Now Weber's Law lays it down that the sensible discrimination depends solely upon this matter of ratios; that it increases or decreases according as the quotients are larger or smaller. Consequently, the difference between 40 and 45 gr. ought to seem larger to us, and therefore be recognised in a larger percentage of tests, than the difference between 50 and 55 gr. Hence our assumption that a peripheral, physiological change co-operates with distribution of the attention to affect our sensible discrimination has led to a conclusion which is diametrically opposed to the observed facts.

We see, then, that peripheral changes cannot explain the lowering of sensible discrimination that comes with distribution of attention. And it is clear that what holds of the peripheral holds also of the central conditions of sensation. We cannot imagine that a weakening of the excitatory processes in the cerebral cortex —such as might result from lessened excitability of a sensory center—would bring about a reduction of the apparent differences between them. Nor can we give any reason for a diminution of their objective difference, that is, for the approximation of the excitatory processes themselves. We are, therefore, forced to ascribe the observed change in sensible discrimination to the degree of consciousness, the mind's own power of apprehension. And this conclusion takes us a step farther. The effect of one and the same difference of sensory excitation, a difference mediated by just the same peripheral and central elements, will be greater or smaller according as we are more or less disposed to receive it, more or less prepared to apprehend it. This *preparedness* consists in the excitability and revivability of ideas that may be employed for the required comparision of sense-impressions. To these must be added, further, the mental activities that subserve speech,—in this case the naming of conscious contents and their differences; while, lastly, the motor innervations that precede the deliverance of a judgment of comparison may also be more or less 'prepared.' At this point, then, we may say that distribution of attention implies a lessened excitability of all the processes concerned in the apprehension and communication of the contents of perception. And it is now easy to understand why the difference must be increased if our tests are to give the same number of correct judgments as we obtained with complete concentration.

The principle which we have here laid down may be extended to all sorts of differences between sense-impressions,—qualitative, temporal, and spatial. We may, then, generalise it to read: a distribution of attention means a lowering of sensible discrimination. Our apprehension of the external world attains its greatest certainty and delicacy only by aid of an unconditioned concentration. At the same time, this law gives us our first real insight into the nature of psychophysical distinctness and indistinctness. The contents of consciousness, as revealed to us by introspection, are determined not by the excitations of sense, but by all the manifold modifications that these excitations undergo when they cross the threshold of consciousness. There is no single sensation that has not been wrought upon in this way by a thousand busy influences. What a sensation would be without them, we cannot possibly tell; we carry with us a store of experiences and ideas, and we cannot escape from our past. Only the distribution of attention throws a certain light upon the phenomena, and shows us something of what mental processes may be that have no related states or processes to welcome them to consciousness. It seems that, in this state of attention, differences are diminished, and there is formed an obscure total impression that acts as a darkened background to raise into still higher relief the main events of consciousness.

We are now in a position to review and to estimate the *influence of attention upon sensitivity.* We mean by sensitivity the capacity to apprehend sensations in their absolute character; to experience a tone or color or smell as a peculiar content of consciousness, and to define its various attributes of quality, intensity, and duration. The first important point to notice is that we are able by attention to favor any one of these attributes at the expense of the others. If I concentrate my attention upon the pitch, i. e., upon the quality of a tone, my capacity to determine its intensity or duration is diminished. Further distribution of the attention enhances this effect. In particular, there is a tendency to underestimate the quantitative aspects of an impression,—its intensity, duration, and spatial extent,—when the degree of attention bestowed upon them is lessened. No such influence has as yet been made out in the case of quality: distribution of the attention does not raise or lower the pitch of a tone, and does not tinge a red either with yellow or with purple. But any impression, however insistent, may pass wholly unobserved, when distraction of the attention has reached a certain limit. We then have no ear for the loudest noise; and intensive smells and glaring colors are entirely unremarked.

It is but a very small proportion of these facts that can be referred to peripheral conditions. The mechanism of adaptation with which, as we have seen, certain of the sense-organs are provided, can effect but a slight decrease in the intensity of sensation. All further change must be credited to the account of attention. The fact that one attribute of sensation can reach a high degree of consciousness at the expense of others shows, perhaps more clearly than anything else, the vanity of an appeal to peripheral factors. For we find no trace in the sense-organs of a mechanism that should, for instance, diminish intensity or extent or duration for the benefit of quality.

We can, then, grant to peripheral conditions but a relatively insignificant share in these changes of sensitivity that come with a divided attention. The question now arises, whether we can point, with any degree of certainty, to the real conditions of the described phenomena. There are, we may conjecture, only two factors to be considered: preparedness for the particular sensations, and susceptibility to the ideas which the sensations are able to revive. An impression will come the more easily to consciousness, the better we are prepared for it. Where there is increased excitability of the corresponding sensory centres, it is possible for comparatively weak stimuli to set up an excitation that shall be adequate to the touch-off of a sensation. The required increase of excitability may be effected, e. g., by the state of expectation. If I am expecting a determinate sense-impression,—say, the tone of a bell or the lighting of a lamp,—I perceive it, when it appears, with especial quickness and distinctness. This preparedness for certain sensations does not imply any enhancement of their intensity: we may be prepared for weak as well as for strong impressions, and a faint sound may, on occasion, find easier ingress to consciousness than a loud sound. Hence the parallelism which, within certain limits, has been shown to obtain between increased intensity and increased concentration is not a fact of fundamental importance. It simply means that a tone, e. g., may appear louder than another tone, not only when it is objectively and peripherally the stronger, but also when we are especially well prepared to receive it.

Here again, therefore, we must lay particular stress upon the second of the two factors just now spoken of: the preparedness for all those ideas (or, more generally, for all mental acts) which help us to assimilate, to interpret, and to define the impressions that we receive. Every new-comer to consciousness, every new conscious content, has a certain *tendency to reproduction*, that is, a certain power to call up or call back other ideas. For instance, I hear some one say "To be or . . ."; and at once there arises in me the tendency to add "not to be," and to go on with the monologue. Or I make my first visit to a picture gallery, and see a portrait, the style of which is familiar to me; I am at once reminded of the name of the painter, though he was not at all in my mind when I entered. The tendency to reproduction that a given idea possesses is dependent upon the permanence of the *association* subsisting between it and the idea which it recalls. This 'association' between two ideas is formed when they are simultaneously present in consciousness or succeed each other at not too long an interval. The more frequently the connection is realised, the more lasting will be the association of the ideas, and the stronger the tendency that each has to reproduce the other. It should be said, also, that ideas which are merely *like* one of the originals possess an equal or similar tendency to reproduce the other, despite the fact that they have never been associatively connected with it. A portrait that I now see for the first time may call up the name of a certain painter,—because its style is *like* that of the portraits with which I am familiar,—just as certainly as these portraits themselves. The effect of the association in this case is evidently indirect.

Now there can be no doubt that impressions for which we are prepared have a stronger tendency to reproduction than have sensations whose path to consciousness is not smoothed by any special susceptibility. But our 'preparation' for an impression means a special preparedness of all the ideas that are reproducible by it. The facts constrain us here, as they did just now when we sought to explain the influence of attention on sensible discrimination, to regard this factor of preparedness as extremely important. If the direction of attention can be so nicely regulated that we are able to attend to some one attribute of a sensation and neglect the rest, then assuredly we have more than can be accounted for by an enhancement of excitability in the sensory centres, and a consequent increase of tendency to reproduction. Without some further condition, we cannot explain how it happens that the pitch of a tone may be better 'prepared for' than its intensity or duration. So far as these attributes are concerned, the excitation is just as much an indivisible unity as is the sensation or the stimulus. But every one of the three attributes has its own associative connections with other ideas. We have, then, only to imagine that the group of mental processes connected with the quality of an impression has attained a higher degree of preparedness than the group associated to intensity or duration, and we can readily understand that the former will be more clearly perceived and more easily identified than the latter. And the same explanation will hold of those typical instances of attention that we selected at the outset of our inquiry. We do not hear the noises in the street below; we do not see the pattern on the wall before our eyes. These things do not mean that the excitability of the sensory centres has fallen too low; but rather that consciousness is preoccupied, i. e., that the ideas reproducible by the impression are not in preparation.

A third fact in the sphere of sensory attention is the *analysis of complex perceptions*. So important is this analytical function, that some writers make it the fundamental fact in the psychology of attention. As instances of its working, we may cite the hearing of overtones in a clang, the tracing of simple motives in some ornate design, the tasting of a particular ingredient in a highly elaborate dish. As a rule there is little difficulty in bringing these cases under our first two heads. For it is obvious that the analyses imply the work of sensitivity and sensible discrimination. The differentiation of a content from other contents, simultaneously present, and its definition in absolute regard, without respect to these others, are the basal processes which every analysis presupposes. It follows, then, that the factors involved in attentive analysis are a preparedness for the constituents which the analysis is to discover, and a susceptibility to the reproductive influences which these constituents exert.

It is a well known fact that our analysis of a complex impression is greatly facilitated if its constituents have previously presented themselves in insolation. When the tone, which we are to hear as overtone in a given clang, is first sounded by itself upon the instrument, it stands out much more clearly in the mass of sound. When a friendly finger has traced the outline of the figure concealed in a puzzle picture, we have no difficulty in finding it again for ourselves without assistance. Our susceptibility to an impression is greater, if the impression has recently formed part of our consciousness. Now it is clear that this state of affairs is not the work of attention. The mere repetition of the stimulus sets up a tendency to its renewal, to its reception at some later time. We may have strained our attention to the utmost, and yet have been unable to hear the overtone or to see the concealed figure. Now that the stimuli have been given separately, the task offers no especial difficulty. What is it, then, that has happened in the mean time? And how do facts of this kind help us towards a knowledge of the nature of attention?

It is certain that our preliminary hearing of the overtone by itself has made us better prepared to hear it as overtone in the clang. This means that our previous preparation for the recognition of the tone in question was inadequate. Hence, the reason that the attention at first failed to perform the task of analysis set it by the clang is that its direction was too indefinite, that it could not adjust itself accurately to the required object. The attention, that is to say, cannot overcome difficulties of its own intrinsic power, but is always and everywhere dependent upon the preparedness of our ideas. If there is no preparation, then there is no analysis, no recognition, no perception. Any impression, or aspect of an impression, that can be taken in with complete attention, has been prepared for by previous experience, and serves to realise specific tendencies to reproduction. Once more, then, we are forced by facts to the conclusion that the mental state or attitude which we term attention consists in the preparedness of the ideas reproducible by the various contents of consciousness.

## IV.

All the phenomena of which we have so far spoken are due to the lessening of concentration and to the repression of those changes in conscious contents which concentration effects. We have considered distribution only so far as it brings with it a lowering of concentration. At this point, however, we may raise the further question of the *influence of division or distraction of the attention upon the range or number of the objects which it embraces.* We can put the matter to test by a simple experiment. By help of an instantaneous shutter, we can project upon the screen of a camera, say, for a tenth of a second, a number of letters that do not 'make sense' or combine into a pronounceable syllable. Let us arrange them in three lines of four letters each. The observer is instructed, beforehand, to keep his gaze fixed upon the part of the screen where the letters are to be exposed. He is placed at such a distance from the camera that all twelve letters may be 'peripherally' distinct while his eyes remain unmoved. He is asked, first of all, to read as many letters as he can with undivided attention during the interval of exposure, and to report what he has seen as soon as the shutter closes. The result of the experiment is that he can name only six letters. In a second test—for which, of course, new letters must be employed—the observation is made under distraction. The observer may be required, for instance, to repeat aloud the series of whole numbers, beginning with 1, and omitting six numbers at each step, i. e., 1, 8, 15, 22, etc. When the count is in full swing, the letters are again exposed. He can name no more than three of them.

The experiments show, then, that distribution of the attention reduces the range or number of the objects that can be simultaneously grasped with complete concentration. The reduction cannot be referred to peripheral causes; for we have taken especial pains to make the peripheral conditions of the two tests the same. Moreover, the three letters that are seen in the second case are not less distinct than the former six; and it is difficult to understand how the peripheral conditions of perception should have sufficed for these three, and not for their immediate neighbors as well. We are thrown back, therefore, upon the same factors to which we have earlier appealed for explanation of the phenomena of attention. The exposed letters find us more or less well prepared to receive them, and thus gain a more or less ready access to the consciousness of the time. Our susceptibility to impression by the visible symbols is, without any doubt, greater in the first and less in the second experiment.

Nevertheless, the question still remains why the subjective effect of a division of attention should be to reduce the number of the constituents in a total presentation, and not rather to make the presentation itself uniformly indistinct. *A priori*, the second alternative is as probable as the first. The observer, while he was engaged upon his counting, might have seen just as many letters as he saw before, without being able to identify and name a single one of them. In this case, then, our explanation seems to halt; it gives no reason for our perceiving fewer letters than we perceived with complete concentration, but perceiving these few with practically the same distinctness. In reply, it may be urged, first of all, that, as a matter of fact, our susceptibility to the different letters is not precisely the same. It has been proved, by special experiments, that some letters are read more easily than others. Moreover, we are quite safe in assuming that there are differences of preparedness or of central excitability,—accident favoring certain portions of the field of vision, or certain objects, more than others. And it is reasonable to think that such differences, once present, will lead us to see a smaller number of letters with approximately equal distinctness.

All this, however, is vague supposition. Much more important is the fact that it *is* possible, by division of the attention, to induce simply a general indistinctness of the whole presentation. In the experiment which we have just described, the observer was asked to read as many as possible of the letters during the brief interval of their exposure. That is to say, his instructions were couched in terms that of themselves laid a certain stress upon the separate constituents of the impression, i. e., upon analysis. But we can attack the problem in a different way. We can repeat the experiment, requiring of the observer that he shall try to see as many letters as possible, and then merely give their number; he need make no effort to name them. Under these conditions, he estimates the number of the letters seen with complete attention at twelve, and can name no more than two or three. When his attention is distracted as before, by the counting, he sees ten letters in all, and cannot name a single one; the whole number appear together as an indistinct mass.

We see, then, that the simple change of instructions makes a very great difference in results. The decrease of the range of attention is now comparatively slight; but the degree of consciousness has been lowered for all objects alike. The whole visual impression has taken on the character of extreme transiency. The effect produced is much the same as that which we obtain with complete attention by shortening the time of exposure. Hence there can be no doubt that the outcome of this sort of experiment is largely dependent upon the adjustment of attention, the particular kind of preparation,—in a word, upon predisposition. Just as we may be susceptible to one and only to one of the attributes of a sensation, so may we take this or that attitude, be thus or thus prepared, as regards the number of contents that is to be expected. If we are predisposed to read individual letters, we shall do one thing; if we are merely prepared to perceive as many letters as possible, we shall do another. This difference in the adjustment of attention need not, of course, be voluntary; it may be due to causes that lie beyond our volition. But its influence can be traced more clearly and more easily in the case of voluntary attention, because here we can better take account of the constellation of ideas that has formed in consciousness.

There is still another peculiarity of the attention that we must not pass without comment. If we compare the results of the two experiments with complete concentration, we see that, in the first, more letters were read, but less of the total impression was seen, than in the second. The same conclusion follows from a comparison of the experiment with divided attention. There must, then, be a peculiar relation obtaining between distribution and concentration. The greater the range of attention, the lower is the degree of consciousness attaching to any individual content; while, *vice versa,* the number of the objects grasped by attention decreases, as concentration upon any one of them increases. Since, now, we can measure the work of attention not only by degree of concentration, but also by the range of objects attended to, this correlation of the two—increase in the one direction meaning decrease in the other and conversely—leads us to the idea that the *energy of attention is limited and approximately constant in its limitation.*

This idea is supported and confirmed by the following fact. When we ask how the degrees of consciousness are related to one another, we find, not a uniform gradation from the highest to the lowest, but, in most cases, a fairly sharp line of distinction. Certain contents stand at the level of clear apprehension; and from them our consciousness drops away, without transition, to the level of obscure general impression, above which the other contents of the time are unable to rise. And the clearer the first group of contents, the more indistinct are all the rest. It follows, then, that an increase of concentration for certain processes implies a decrease of concentration for others. This important fact is our sole justification for opposing—natural as the opposition seems—attention to inattention, distinct to indistinct consciousness. If, therefore, at any given moment we make a cross section of the stream of consciousness, we shall find represented on it, not all conceivable degrees of consciousness, but as a rule just two groups of processes separated from each other by a considerable interval. We thus have the right to conceive of attention and inattention, and to bring our experimental methods to bear upon them, as two wholly distinct states of consciousness, rather than as degrees of the same state connected by intermediate stages. At the same time, we have a further suggestion of a certain constancy in the amount of available energy; only that we are now dealing, not simply with the energy of attention, but with the total energy of consciousness itself. For attention and inattention, extending as they do in different directions from a common point of indifference, include all conceivable degrees of consciousness. Attention may rise to the level of the greatest possible distinctness, and inattention may sink into the limbo of the unconscious.

These facts, again, may be illustrated without difficulty from the occurrences of every-day life. The teacher, in his endeavor to guard his pupils from mind-wandering and distraction, seeks to bring their attention to the highest possible degree of concentration for the subject which he is discussing. He attains this end most certainly if he can connect the new matter with something already known and familiar, that is, if he can secure a maximum of preparedness for the new ideas. Again, the occupation that fills our mind most completely, i. e., that meets with an especially favorable reception from our present store of sensations, ideas and experiences, is at the same time that which makes us deaf to other claimants for the attention and inaccessible to other stimuli. The best way to overcome fatigue, pain, ill humor, distressing or irritating circumstances,—to make ourselves insensible to them,—is to apply ourselves to the task which we know by experience will lay the strongest hold upon attention. All these phenomena point to the importance of preparedness for the processes of attention, and thus serve to supplement our theoretical discussion. At the same time, they enable us to trace the constancy of the energy of attention, which (as we have maintained) finds expression in the inverse relation of cencentration and distribution, to the constancy of the more extended energy of consciousness. That increase of degree is necessarily connected with decrease of range of consciousness finds its explanation in the fact that, while the degree of indistinctness remains the same, only a determinate amount of clearness in consciousness is available.

## V.

Our discussion of the nature of attention has made it clear that the excitability and preparedness of ideas are the determinant factors in its operations. It is, then, to be expected that *memory and recollection*, *reproduction and association*, will be peculiarly dependent upon the processes to which the name of attention is given. And as a matter of fact they are thus dependent to an extraordinary degree. The greater the concentration, the more active, first of all, is the *tendency to reproduction* of the conscious contents upon which attention is directed. The man of science who is engaged upon a definite problem, the artist who is seeking to realise a definite idea, the orator who is following out a definite train of thought, all alike are at special pains that the main issue of the task before them shall receive a full measure of attention; for in this way their whole furniture of ideas is made more available, more accessible,—the stream of consciousness runs more freely and smoothly. Only the connections that have become mechanical suffer when their terms are thrown into relief by voluntary attention. For the constructive work of creative imagination or original thought, the active co-operation of attention is absolutely necessary. It is the essential condition of all the higher forms of mental activity, theoretical and practical. It makes possible, as it continually assists, the policy of the statesman, the projects and achievements of the technician, and the combinations and inferences of the mathematician. We say that a man shows genius, when he discovers new aspects or new attributes where all the rest of the world have passed by unheeding. But such discovery demands an absolute impartiality of attentive observation, and the freedom from current views and prejudices, consecrated and confirmed by habit and tradition, which this observation implies.

Secondly, the contents that are apprehended with complete concentration, the *apperceived* contents, as they are often termed, gain a quicker and a more lasting hold upon *memory* than those which meet a divided or distracted attention; and are, therefore, when occasion arises, more easily and accurately reproduced. What is obscurely experienced ('obscurely' in the sense of psychophysical indistinctness) is but imperfectly recalled; we cannot give any confident opinion about past events unless we apperceived them at the time of their occurrence. We may "dimly remember" that something happened; but, as conscientious people, we shall "prefer to say nothing definite about it." Nor is the attention of less importance, thirdly, in the formation of *associations*. When the contents of consciousness, simultaneous or successive, fail wholly to attract it, no amount of repetition can effect a permanent and effective association between them. It is waste of time to try to memorise rules or dates or formulæ, when one is distracted. How serious the waste is, we may infer with some approach to accuracy from an observation made in a different connection. It has been found that the time required to learn by heart a series of nonsense syllables is about ten times as long as that required to learn, equally well, the same number of short words. Now the words repeated by the inattentive student are transformed, by his inattention, into a set of meaningless syllables. Hence it will take him at least ten times as long to master his task, in this state of mind, as it would if he gave the subject his undivided attention. I say "at least" advisedly: for the inattentive student will, of course, accomplish even less than the observer who does his best to learn the nonsense syllables. Special experiments have been made to determine the influence of distraction, of a secondary occupation, upon the observation and memorising of letters, displayed one after another in quick succession; with the result that, under such conditions, the observer is wholly unable to retain or to recall the arrangement of the stimuli, their position in the series. The few letters that he has recognised, and can later reproduce, come to him as mere disconnected fragments, not as members of a circumscribed and orderly group.

The fact, then, is clear enough,—that attention is essentially concerned in retention and reproduction, in every act and function of imagination and memory. And the explanation is equally clear, when we remember that 'attention' implies the preparation of the ideas that we are seeking to reproduce, and the opening-up of their particular associative connections. 'Attentive learning' then means, simply, a learning under favorable conditions of preparedness and of tendency to reproduction. And complete distraction must mean, on its side, a reduction of both these favorable conditions to a minimum; the practical impossibility either of taking up a given idea into the memory, or of reproducing other ideas. But this conclusion seems to bring us into conflict with a point of fact which we touched on, briefly, a short time ago: the fact that an *automatic connection of contents or movements*, a connection that has been made and established once for all, has nothing to gain from the intervention of attention,—nay, suffers a very positive loss in accuracy and rapidity of realisation, if the attention be directed upon it. Repeat to yourself a piece of poetry that you have learned by heart, and try, as you proceed, to give each separate sentence a full measure of attention: try to apperceive each successive incident of your morning's toilet, or of the formation of the letters in writing. What is the result? Your habitual associations break up and refuse their office; your hands are clumsy; you lose the thread; it is only by thinking the matter out, circumstantially, that you can continue a process which ordinarily runs smoothly and certainly to its conclusion. You made yourself master of this automatic sequence of activities, in the first place, by help of concentrated attention. Now that you have reached the goal, an apperception of the separate phases is disturbing and paralysing.

A closer consideration will, however, enable us to harmonise these outstanding facts with our explanation of the phenomena of attention. For, in the first place, we have not asserted that the course of each and every organic process is favored by the attention. Nutrition and digestion, circulation and respiration, and many other related bodily activities, discharge their functions in orderly fashion for the benefit of the organism, without the least participation of consciousness and apperception. It is this same mechanical precision that we find in the activities mentioned above, which run their course most surely and certainly in the twilight of consciousness, or even in unconsciousness itself. If, then, the bringing of these processes into the full light of conscious apprehension diverts them from their accustomed path, the inference is simply that they (or, rather, their constituents) are thrown by apperception into new and disturbing relations. A single link in the chain of interconnected processes is now isolated and set in a novel context; with the result that its original effectiveness is destroyed. Diverse tendencies to reproduction are mutually exclusive. The attentive observation of one term in an automatic train of mental or muscular activities 'prepares' a special set of ideas, very different from the terms that in the accustomed order of things would naturally follow it. It is not surprising, therefore, that the direction of an analytical attention upon these habitual sequences of mental or bodily process should mean a balk, an interruption, a loss of memory. It may be that the processes themselves are governed from subcortical brain centres, and not from those higher centres with which are connected the conscious contents experienced in the state of complete attention. If this be true, we see still more clearly why the raising of single terms of an automatic connection to the level of psychophysical distinctness must of necessity weaken or destroy the associative relations that obtain between them.

We must not close this discussion without reference to a further peculiarity of attention, the *relative slowness* with which it passes or travels from one content to another. If, for instance, we listen to a series of sounds which are a quarter of a second apart, —say, to the ticking of a watch,—we find it impossible to grasp each separate impression by a separate act of apperception. We have not time, in the brief interval that elapses after the hearing of the first stimulus, to readjust our mind for the second. The sound 'gets ahead' of us, and we soon give up our fruitless endeavor to overtake it. The consequence is that, at a certain limit of rapidity, every series of impressions breaks up, involuntarily, into groups. These groups are the foundation of all rhythmical articulation and division. We distinguish, in any given rhythm, between an accented term, and one or more unaccented terms. The accented term is apperceived; the others follow it too quickly to receive special apperceptive emphasis. It is clear, then, that the interval separating the accented terms of a rhythmical series gives us a measure of the rapidity with which successive acts of attention may be realised. With simple sound-impressions, and under favorable conditions, this interval is, approximately, one second. Similar phenomena have been observed in the process of memorising nonsense syllables by reading them aloud. At a certain rapidity of reading, the syllables fall of themselves into rhythmical groups; and it has been proved that juxtaposed terms which belong to one and the same group, the same rhythmical 'foot' or 'measure,' are more firmly associated than juxtaposed terms which belong to different groups.

These facts, and others like them, have led psychologists to speak of a distribution of the energy of attention. Such a distribution occurs, to some extent, in the case of automatic sequences; for there are always certain terms in the series that receive a measure of apperception, however small, while the rest follow as it were in the train of the accented members. The speaker who is delivering an address that he has learned by heart gives special attention to certain cardinal points of his argument, believing that the mechanism of association of ideas will then provide for the smooth and logical development of the subordinate sentences. So that even in activities like this, where term seems to follow term altogether automatically, there is still some part to be played by the attention. But if a term that was originally unaccented, and that has its fixed subordinate place in the whole sequence, is suddenly apperceived, the train of thought will necessarily be deranged: the idea has been raised from its menial position to take all the responsibilities of a new series, to become the independent starting-point of further associations, and must, of course, break off its old connections. At the same time, the flow of the speaker's ideas will be retarded; the attention requires time to meet the demands laid upon it. Now we may freely admit that, in the complicated activities of real life, the groups are incomparably larger and the unaccented pauses indefinitely longer than they are in the simple experimental tests that we have described; but the underlying principles are in all cases the same. In real life, as in the laboratory, the accented term lays down the law for the whole series of unaccented processes that follow, in the sense that, when once the first term is given, the rest of the series runs its course with automatic precision and at unvarying speed. Each successive member of the group is determined by all the members that have gone before; and the first accented member contains within it the tendency to reproduction of all later members, i. e., of the whole group.

Now we have seen that the connection between any two groups is weaker than the connection between the members of a single group. It follows, then, that the interference of attention at unaccented parts of the series will also serve still further to weaken these wider associative connections.

We see, therefore, that the paralysis or interruption of automatic activities, by concentration of the attention upon some one or other of their phases, affords no argument against our attempted explanation of the processes of attention. On the contrary, the facts give us an interesting glimpse into the economy of mind. As an experience becomes accustomed, practised, familiar, it gradually loses in psychophysical distinctness; it approaches, and presently falls below, the limen of consciousness. Its course is then both speedier and more certain; it has grown mechanical. And while this is happening, consciousness itself can turn with increasing energy to the novel and the unaccustomed, guiding them into the right channels of reproduction, and shaping them to useful ends. Mind is thus relieved of a heavy burden: its processes, once trained to their duty, may be removed from the control of attention and left to their own devices, without fear that they will wander from the path prescribed for them. Attention is like the watchman on some high tower, who, as he surveys the country beneath him, casts an indifferent eye upon the familiar incidents and unsuspicious figures of the landscape, but keenly scrutinises any strange appearance. We have a very delicate sense for what is familiar and what is unfamiliar. Some psychologists, accordingly, believe that accustomed impressions take on a special attribute, a 'quality of familiarity,' which can make a thing appear familiar to us, without our being able to say where and when and under what circumstances it formed part of our past experience. But we may say very much the same thing of the novel and the unfamiliar: the 'quality of unfamiliarity' consisting, in part, of a certain restlessness and excitement in face of the experiences, and partly of the peculiar mood of *interest*.

Interest is a pleasurable mood, into which we lapse whenever anything 'attracts' or 'fascinates' our attention, i. e., arouses the activity of those higher centres which form the immediate substrate of consciousness. So close is the connection between attention and interest, that the latter term is sometimes used to denote attention itself, and even to designate the objects which excite and sustain attention. When, for instance, we say that a man's interests are wide or narrow, we mean by "interests" the whole range of objects that may engage his attention. When, again, we remark that our interests lie in a certain direction, or insist that our friends ought to take an interest in certain questions, we are employing the word as an equivalent of "attention." In view of this uncertainty of usage, it is necessary for science to select and steadfastly to adhere to some one meaning: otherwise the term loses all its value. And the best meaning is, evidently, that of the mood or emotional state which invariably accompanies a strain of the attention, provided that this strain is not pushed so far as to induce fatigue and dull the faculties. The pleasurable mood of interest is very readily aroused by novel impressions, which have no fixed associations with previous experiences or stereotyped phrases. True, an increasing store of ideas, while it enables its possessor to meet and assimilate new perceptions and thoughts more quickly and easily, also sets narrower and narrower bounds to his susceptibility for the unaccustomed and the unknown. The capacity of the mind to enlarge its horizon, to multiply its aptitudes and experiences, is exceedingly limited; though we must add, in fairness, that it differs very greatly in different individuals. This is the reason that the number and variety of interesting objects are greatest in youth, and least in old age.

This decrease in susceptibility to new impressions is, in some measure, compensated by the imperfection of memory and the changes which naturally occur in our furniture of ideas. Thanks to these two influences, the familiar does not always remain familiar, but after a long interval regains something of the character and stimulus of novelty. A problem that has occupied us without interruption for a considerable period of time comes finally to be associated with a whole number of accustomed ideas, which go far to dull our interest in it and to prevent or obscure the removal of outstanding difficulties. If we then lay it entirely aside, and return to it later from a different kind of work, we find that the very points which previously attracted but little attention strike us with all the force of a new impression and indicate, or at least pave the way for, a final solution. This is the experience of every one who has worked and thought on scientific matters. It is also the experience of the artist when he pursues an idea and attempts to give it shape; and of the inventor, when he seeks to put theory into practice. Facts of this kind are usually explained on the assumption that the earlier efforts have left their effect upon the subconsciousness and that the later advance is possible only because the mind has been silently at work. The explanation may hold in certain cases, where the interruptions of conscious occupation with a problem are but short. But we are thinking here of longer intervals,—intervals so long that the old and familiar come to us with the charm of novelty, that the mechanical and habitual connections are weakened, their certainty imperilled, and their binding force reduced. The whole problem, or whatever it may be, stands out in the clearer light of attentive consideration; it forms new connections, and enters into new associations. Furthermore, our stock of ideas has also undergone, in the meantime, more or less serious changes, so that even an old idea may re-excite the activity of reproduction, and start it developing in a new direction. This is what happens to any one who, after a lapse of years, takes up a book that he once read, or studies observantly and critically the pictures of a gallery which he once hurried through with inattentive mind.

## VI.

We have no space to enumerate all the various factors that involuntarily draw our sensory or intellectual attention upon them. Nor can we pause to indicate the means which experience has shown to be best suited to induce a distraction of the attention. We must also pass over the bodily accompaniments of attention, which have recently been made the subject of repeated investigation. In the present state of our knowledge, the fact that an acceleration of pulse or irregular breathing sets in when the mind is concentrated upon some intellectual employment, cannot be turned to account for a theory of attention. On the other hand, we cannot conclude without raising the question how it comes about that we can offer effectual resistance to distracting stimuli. Our power in this regard is of extreme importance for life in general and for mental development. If our perception and thought and volition depended solely upon the intensity of the stimuli presented to us, we should be at the mercy of external circumstances, and continuous work, any definite and systematic activity, theoretical or practical, would be utterly impossible. We should be like those instable natures who are swayed this way and that way by every breath of opinion; there would be no such thing as acting on principle, no character that could inspire our confidence by wisdom and reliability. Is our theory of the nature of attention strong enough to bear the brunt of a fact like this, a fact of cardinal import for the whole race of man?

How well we are prepared to meet new contents that appear in consciousness depends in very large measure upon the frequency and familiarity of the ideas concerned. The more we have been obliged to occupy ourselves with certain thoughts and experiences, the more firmly do they establish themselves in our minds, and the more easily can they be reproduced and set in motion. At the same time, the simultaneous and successive connections in which the separate contents have been given become by frequent repetition stronger and more certain, and the resulting associative relations more binding and more inflexible. If, now, our susceptibility to external or internal stimuli, to peripheral and central excitations, depends upon our preparedness to receive them, then the whole of the individual's past, with all its associations, will be arrayed in order of battle to meet the scattered assaults of chance. So that, however strong a stimulation may be, still it will lack the power to break into the serried circle of ideas, or at least to hold its ground after the attempt, unless it can make clear its right to entry. What the mental acts and dispositions that we hold in preparation lack in strength is more than compensated by their connection with the permanent tendencies and capacities of the individual, and by the closeness of the associative bonds in which they are united. Behind the attention, behind distinct consciousness, stands the whole experience of a personality; and it is the nature of this experience that decides what shall excite and fascinate the attention.

Our theory has stood the test. Nay, more, it demands that apperception shall be rooted deep in the thought and volition of an experiencing subject. Circumstances do not rule us, but we confront circumstances,—choosing, arranging, and directing. Our mind is not the sport of incalculable accident; but according to the measure of the strength that is in us, the strength that manifests itself in attention, we can transcend the limits of our organism and help to mould the universe, propounding and realising ideal ends. We do not stand in the mere course of events, indifferent transmitters of mechanical processes; we prove our independence and our freedom by rational test and consideration of the impressions that pour in upon us, and by consistent devotion to the plans and tasks that our conscience has approved. But, we must remember, this power that manifests itself in attention and makes it the mirror of the whole personality is not acquired at haphazard. Education, —the education that we have received or have wrought out for ourselves, decides how well the ideas are prepared which we have to cast into the balance for attentive observation or recollection, for constructive work of imagination or understanding. If there is anything plastic in the mind and its capacities, it is surely the attention,—whose first original fickleness and uncertainty must be trained to constancy and steadiness, and whose unlimited susceptibility to all that can interest man must not be suffered to degenerate into an uncritical surrender to each and every impression, useful or harmful, seasonable or unseasonable, good or bad. We must, then, set to work betimes to ensure the right preparation for apperception. Thus equipped, we shall issue as conquerors from our battle with the changes and chances, the burdens and temptations of life.

O. KUELPE.

WÜRZBURG.